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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,637	02/19/2004	Kosei Takiishi	249104US8	1879

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EXAMINER	
ALHIJA, SAIF A	
ART UNIT	PAPER NUMBER
2128	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/780,637	TAKIISHI ET AL.
	Examiner	Art Unit
	Saif A. Alhija	2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 July 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 19 February 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 7/9/07.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-8 have been presented for examination.

Response to Arguments

2. Applicant's arguments filed 9 July 2007 have been considered but are moot in view of the new ground(s) of rejection.

i) Following Applicants amendments the 101 rejection of claims 1-8 is withdrawn.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 9 July 2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner has considered the IDS as to the merits.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claim(s) 1-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Coulson et al. "A Statistical Basis for Lognormal Shadowing Effects in Multipath Fading Channels" IEEE 1998,** hereafter **Coulson,** in view of **Zhao "MULTIPATH PROPAGATION CHARACTERIZATION FOR TERRESTRIAL MOBILE AND FIXED MICROWAVE COMMUNICATIONS,"** hereafter **Zhao** further in view of **Zhao et al. "Multipath Propagation Study Combining Terrain Diffraction and Reflection", hereafter Zhao2.**

Regarding Claim 1:

Coulson discloses A time-varying multi-path generating apparatus for simulating multi-path fluctuations in radio communications, comprising:

a parameter control unit for controlling a plurality of conditions for generating a plurality of propagation paths, the conditions being parameters and data files, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a data storage unit for storing the parameters and data files for generating the propagation paths, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a random number generating unit for generating and outputting a plurality of random numbers based on a random number parameter provided by the parameter control unit, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

and a propagation path generating unit for generating a plurality of time-varying propagation paths, **(Coulson. Page 495, Figure 2, Channel Fading Model. Page 495, Figure 3, Time Domain representation of channel)**

a buffer memory unit configured to store the generated time-varying propagation paths, **(Coulson. Table II, Results)**

wherein a plurality of time-varying amplitude functions and a plurality of time-varying phase functions are generated based on the parameters and data files for propagation path generation stored in the data storage unit, and the random numbers generated by the random number generating unit, **(Coulson. Page 497, Section III (C), Random Variables for Monte Carlo Simulation)**

the time-varying amplitude functions are aligned serially in the time domain such that a time-varying shadow amplitude function is obtained, which is repeated N times, where N represents the number of the propagation paths, resulting in N time-varying shadow amplitude functions, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

the time-varying phase functions are aligned serially in the time domain such that a time-varying shadow phase function is obtained, which is repeated N times, where N represents the number of the propagation paths, resulting in N time-varying shadow phase functions, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

an initial amplitude, an initial phase, an initial time delay, and an initial arrival direction are generated as the propagation path parameters of a propagation path using random numbers provided by the random number generating unit based on the initial value generation parameters stored in the data storage unit, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

and the time-varying shadow amplitude functions and the time-varying shadow phase functions are superimposed on the initial amplitude and the initial phase, respectively, for generating a plurality of time-varying propagation paths, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3. Title and purpose of the reference is determination of shadowing effects in multipath propagation)**

Coulson does not explicitly disclose wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object.

However Zhao discloses wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges. **(Zhao. Page 9, Introduction, Paragraph 4, EM Wave Reflection. Page 13, Section 2.4.1, Figure 3, Knife Edge Defraction. In addition,**

propagation paths are brought together with a RAKE receiver which can be seen on Page 27, Figure 10, for example)

Coulson and Zhao do not disclose edges at opposite ends of the shadowing object.

However Zhao2 discloses edges at opposite ends of the shadowing object. **(Zhao2, Page 1204, Introduction, double edge and multiple edge diffraction. Page 1205, Figure 2a/b, showing multiple knife edges and double knife edges surrounding reflection objects)**

Coulson, Zhao, and Zhao2 are analogous art in that they deal with multipath propagation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the calculations of **Zhao** with respect to knife diffraction with the calculations of **Zhao2** utilizing double and multiple edge diffraction with **Coulson** since knife-edge diffraction is a known issue in multipath propagation as can be seen in **Zhao** on page 11, Section 2.1, Introduction, Paragraph 3. Obstacles in mobile communications are often modeled as knife-edges and must be considered when computing propagation information. Further multiple edges must be considered as per **Zhao2 in order to deal with terrain diffraction, see Zhao2, Introduction, first 2 sentences.**

Regarding Claim 2:

Coulson discloses A time-varying multi-path generating apparatus for simulating multi-path fluctuations in radio communications, comprising:

a parameter control unit for controlling a plurality of conditions for generating a plurality of propagation paths, the conditions being parameters and data files, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a data storage unit for storing the parameters and data files for generating the propagation paths, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a random number generating unit for generating and outputting a plurality of random numbers based on a random number parameter provided by the parameter control unit, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

a time-varying function generating unit for generating and outputting a plurality of time-varying amplitude functions and time-varying phase functions, serving as shadow characteristics of the propagation paths based on a

shadow parameter stored in the data storage unit and the random numbers provided by the random number generating unit, **(Coulson. Page 497, Section III (C), Random Variables for Monte Carlo Simulation)**

and a propagation path generating unit for generating a plurality of time-varying propagation paths, **(Coulson. Page 495, Section II, Multipath Propagation Model)** and

a buffer memory unit configured to store the generated time-varying propagation paths, **(Coulson. Table II, Results)** wherein

the time-varying amplitude functions and the time-varying phase functions generated and provided by the time-varying function generating unit are aligned serially in the time domain such that a time-varying shadow amplitude function and a time-varying shadow phase function, respectively, are obtained, which obtaining is repeated N times, where N represents the number of the propagation paths, resulting in N time-varying shadow amplitude functions and N time-varying shadow phase functions, respectively, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

an initial amplitude, an initial phase, an initial time delay, and an initial arrival direction are generated as the propagation path parameters of a propagation path using the random numbers provided by the random number generating unit based on initial value generation parameters stored in the data storage unit, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay.)**

and the time-varying shadow amplitude function and the time-varying shadow phase function are superimposed on the initial amplitude and the initial phase, respectively, for generating a plurality of time-varying propagation paths. **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose of the reference is determination of shadowing effects in multipath propagation)**

Coulson does not explicitly disclose wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object.

However Zhao discloses wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges. **(Zhao. Page 9, Introduction, Paragraph 4, EM Wave Reflection. Page 13, Section 2.4.1, Figure 3, Knife Edge Defraction. In addition, propagation paths are brought together with a RAKE receiver which can be seen on Page 27, Figure 10, for example)**

Coulson and Zhao do not disclose edges at opposite ends of the shadowing object.

However Zhao2 discloses edges at opposite ends of the shadowing object. **(Zhao2, Page 1204, Introduction, double edge and multiple edge diffraction. Page 1205, Figure 2a/b, showing multiple knife edges and double knife edges surrounding reflection objects)**

Coulson, Zhao, and Zhao2 are analogous art in that they deal with multipath propagation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the calculations of **Zhao** with respect to knife diffraction with the calculations of **Zhao2** utilizing double and multiple edge diffraction with **Coulson** since knife-edge diffraction is a known issue in multipath propagation as can be seen in **Zhao** on page 11, Section 2.1, Introduction, Paragraph 3. Obstacles in mobile communications are often modeled as knife-edges and must be considered when computing propagation information. Further multiple edges must be considered as per **Zhao2 in order to deal with terrain diffraction, see Zhao2, Introduction, first 2 sentences.**

Regarding Claim 3:

Coulson discloses The time-varying multi-path generating apparatus as claimed in claim 1, wherein the propagation path generating unit generates the time-varying amplitude functions and the time-varying phase functions using the random numbers generated by the random number generating unit; the random numbers have correlations corresponding to inter-parameter correlation characteristics related to an arriving propagation path angle difference that is stored in the data storage unit for each of the propagation paths; and a shadow time interval, a shadow amplitude, and a shadow occurrence time interval are generated as correlated random numbers that are used as constant parameters of a time-varying function. **(Coulson. Page 494, Introduction, Random Variables, RV's. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose**

of the reference is determination of shadowing effects in multipath propagation)

Regarding Claim 4:

Coulson discloses The time-varying multi-path generating apparatus as claimed in claim 1, wherein the propagation path generating unit adds a time-varying phase rotation to the time-varying phase characteristic of each time-varying propagation path by calculating the time-varying rotation due to the Doppler effect based on a moving speed of a mobile station, the moving speed being provided by the parameter control unit, and the initial arriving direction of each propagation path.

Coulson does not explicitly utilize Doppler effects however they are an inherent characteristic of mobile subscribers.

In addition, **Zhao discloses** The time-varying multi-path generating apparatus as claimed in claim 1, wherein the propagation path generating unit adds a time-varying phase rotation to the time-varying phase characteristic of each time-varying propagation path by calculating the time-varying rotation due to the Doppler effect based on a moving speed of a mobile station, the moving speed being provided by the parameter control unit, and the initial arriving direction of each propagation path. **(Zhao. Page 24, Paragraph 1, Small Scale and Large Scale Fading, Mobile movement. Page 27, Section 4.3, Doppler Spectra)**

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the Doppler calculations of **Zhao** with respect to the calculations of **Coulson** since it would be improper to model multipath propagation of mobile subscribers without taking into account movement of the subscribers.

Regarding Claim 5:

Coulson discloses The time-varying multi-path generating apparatus as claimed in claim 1, wherein: the data storage unit stores directional-gain pattern files of a plurality of antennas applicable to a mobile station, the directional-gain pattern files being provided by the parameter control unit, and containing information about directional gain, and the propagation path generating unit reads at least one of the directional-gain pattern files according to moving directions of the mobile station, calculates N propagation paths by multiplying the directional gain to the initial amplitude of each propagation path to obtain N time-varying propagation paths, which is repeated

M times, M being the number of the antennas, and NxM time-varying propagations propagation paths are generated. **(Coulson. Page 495, Section II, Multipath Propagation Model)**

Regarding Claim 6:

Coulson discloses A multi-path fading simulator, comprising:

the time-varying multi-path generating apparatus for generating N propagation paths for each of M antennas, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a buffer memory unit configured to store the generated time-varying propagation paths, **(Coulson. Table II, Results)** wherein

a propagation path output unit for dividing M.times.N complex amplitudes of the time-varying propagation paths provided by the time-varying multi-path generating apparatus into real parts and imaginary parts, and outputting the real parts and the imaginary parts in an analog form, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

and a signal synthesizing unit, comprising:

at least one digital signal input terminal, at least one digital signal output terminal, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

an orthogonal signal generating unit for generating a plurality of orthogonal input signals (Q component) based on a plurality of digital signals (I component) input through the digital signal-input terminal, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

2.times.M transversal circuits, each comprising (N-1) delay elements that are cascaded, and N multipliers, **(Coulson. Page 495, Section II, Multipath Propagation Model)** wherein

each of the I component and the Q component is distributed to specific transversal circuits, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay.)**

each of the N multipliers is provided with the respective real part, or the respective imaginary part, as applicable, output by the propagation path output unit, the real part or the imaginary part, as applicable, having an initial time delay, and the time delay of each multiplier is set equal to the time delay of the real part or the imaginary

part, as applicable, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay.)**

and each digital signal delayed by 0, one or more delay elements, as applicable, and the propagation path fluctuation that is represented by the real part or the imaginary part, as applicable, are multiplied, and **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay.)**

M signal synthesizing units for adding the multiplication results of every delay time such that the I component and the Q component are obtained, for combining the I component and the Q component such that a digital signal is generated for each of M antennas, and for outputting the digital signal to the digital signal output terminal. **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay.)**

Coulson does not explicitly disclose wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object.

However Zhao discloses wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges. **(Zhao. Page 9, Introduction, Paragraph 4, EM Wave Reflection. Page 13, Section 2.4.1, Figure 3, Knife Edge Defraction. In addition, propagation paths are brought together with a RAKE receiver which can be seen on Page 27, Figure 10, for example)**

Coulson and Zhao do not disclose edges at opposite ends of the shadowing object.

However Zhao2 discloses edges at opposite ends of the shadowing object. **(Zhao2, Page 1204, Introduction, double edge and multiple edge diffraction. Page 1205, Figure 2a/b, showing multiple knife edges and double knife edges surrounding reflection objects)**

Coulson, Zhao, and Zhao2 are analogous art in that they deal with multipath propagation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the calculations of **Zhao** with respect to knife diffraction with the calculations of **Zhao2** utilizing double and multiple

edge diffraction with **Coulson** since knife-edge diffraction is a known issue in multipath propagation as can be seen in **Zhao** on page 11, Section 2.1, Introduction, Paragraph 3. Obstacles in mobile communications are often modeled as knife-edges and must be considered when computing propagation information. Further multiple edges must be considered as per **Zhao2 in order to deal with terrain diffraction, see Zhao2, Introduction, first 2 sentences.**

Regarding Claim 7:

Coulson discloses A time-varying multi-path generating method for simulating multi-path fluctuations in radio communications, comprising:

a step wherein a plurality of propagation path generation parameters and data files of propagation paths to be generated are stored in a data storage unit, the data files comprising propagation path generation parameter files, antenna directional gain pattern files, and time-varying function constant parameter generation condition files, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the parameter control unit reads the propagation path generation parameter files from the data storage unit **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the parameter control unit reads data files about M antennas, such as the antenna directional gain pattern files, from the data storage unit, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the random number generating unit generates random numbers that fulfill propagation path parameter initial value generation conditions of a propagation path to be generated, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

a step wherein the propagation path generating unit sets up initial conditions, such as initial amplitude values of N propagation path parameters based on the random numbers, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

a step wherein the N initial amplitude values and antenna directional gains to a direction of an incoming propagation path obtained from the antenna directional gain pattern file are multiplied to obtain N.times.M propagation path parameters, which parameters are set up, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

a step wherein the parameter control unit reads the time-varying function constant parameter generation condition files from the data storage unit,

a step wherein the propagation path generating unit generates time-varying function constant parameters based on random numbers generated by the random number generating unit, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

a step wherein the propagation path generating unit generates time-varying shadow amplitude characteristics and time-varying shadow phase characteristics of N propagation paths based on the time-varying function constant parameters, and generates shadow fluctuation characteristics of the amplitude and the phase of each of the N propagation paths, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose of the reference is determination of shadowing effects in multipath propagation)**

and a step wherein time-varying multi-paths are generated based on the generated shadow fluctuation characteristics and output from the propagation path generating unit. **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose of the reference is determination of shadowing effects in multipath propagation. Table II, Results)**

Coulson does not explicitly disclose wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object.

However Zhao discloses wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges. **(Zhao. Page 9, Introduction, Paragraph 4, EM Wave Reflection. Page 13, Section 2.4.1, Figure 3, Knife Edge Defraction. In addition, propagation paths are brought together with a RAKE receiver which can be seen on Page 27, Figure 10, for example)**

Coulson and Zhao do not disclose edges at opposite ends of the shadowing object.

However Zhao2 discloses edges at opposite ends of the shadowing object. **(Zhao2, Page 1204, Introduction, double edge and multiple edge diffraction. Page 1205, Figure 2a/b, showing multiple knife edges and double knife edges surrounding reflection objects)**

Coulson, Zhao, and Zhao2 are analogous art in that they deal with multipath propagation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the calculations of **Zhao** with respect to knife diffraction with the calculations of **Zhao2** utilizing double and multiple edge diffraction with **Coulson** since knife-edge diffraction is a known issue in multipath propagation as can be seen in **Zhao** on page 11, Section 2.1, Introduction, Paragraph 3. Obstacles in mobile communications are often modeled as knife-edges and must be considered when computing propagation information. Further multiple edges must be considered as per **Zhao2 in order to deal with terrain diffraction, see Zhao2, Introduction, first 2 sentences.**

Regarding Claim 8:

Coulson discloses A time-varying multi-path generating method for simulating multi-path fluctuations in radio communications, comprising:

a step wherein a plurality of propagation path generation parameters and data files of propagation paths to be generated are stored in a data storage unit, the data files comprising propagation path generation parameter files, antenna directional gain pattern files, and time-varying function constant parameter generation condition files, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the parameter control unit reads the propagation path generation parameter files from the data storage unit, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the parameter control unit reads data files about M antennas, such as the antenna directional gain pattern files, from the data storage unit, a step wherein the random number generating unit generates random numbers that fulfill propagation path parameter initial value generation conditions of a propagation path to be generated, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

a step wherein a propagation path generating unit sets up initial conditions, such as initial amplitude values of N propagation path parameters based on the random numbers, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

a step wherein the N initial amplitude values and antenna directional gains corresponding to a direction of an incoming propagation path obtained from the antenna directional gain pattern file are multiplied to obtain N.times.M propagation path parameters, which parameters are set up, **(Coulson. Page 495, Section II, Multipath Propagation Model)**

a step wherein the parameter control unit specifies a calculation model based on the propagation path generation parameter files, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

a step wherein the random number generating unit generates random numbers corresponding to shadow parameters, **(Coulson. Page 494, Introduction, Random Variables, RV's)**

a step wherein the time-varying function generating unit generates N time-varying functions for the specified calculation model based on the random numbers, **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Serial Alignment can be seen in Page 495, Figure 3)**

and a step wherein, time-varying shadow amplitude characteristics and time-varying shadow phase characteristics are generated for N propagation paths based on the generated time-varying functions generated by the propagation path generating unit, which amplitude characteristics and phase characteristics are multiplied by the amplitude and the phase, respectively, of each propagation path such that shadow fluctuation characteristics are generated, and **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose of the reference is determination of shadowing effects in multipath propagation)**

a step wherein time-varying multi-paths are generated based on the generated shadow fluctuation characteristics and output from the propagation path generating unit.. **(Coulson. Page 495, Section II, Equations 1-2. The equations utilize amplitude, phase, and time delay. Title and purpose of the reference is determination of shadowing effects in multipath propagation. Table II, Results)**

Coulson does not explicitly disclose wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object.

However Zhao discloses wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges. **(Zhao. Page 9, Introduction, Paragraph 4, EM Wave Reflection. Page 13, Section 2.4.1, Figure 3, Knife Edge Defraction. In addition, propagation paths are brought together with a RAKE receiver which can be seen on Page 27, Figure 10, for example)**

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However Zhao2 discloses edges at opposite ends of the shadowing object. **(Zhao2, Page 1204, Introduction, double edge and multiple edge diffraction. Page 1205, Figure 2a/b, showing multiple knife edges and double knife edges surrounding reflection objects)**

Coulson, Zhao, and Zhao2 are analogous art in that they deal with multipath propagation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the calculations of **Zhao** with respect to knife diffraction with the calculations of **Zhao2** utilizing double and multiple edge diffraction with **Coulson** since knife-edge diffraction is a known issue in multipath propagation as can be seen in **Zhao** on page 11, Section 2.1, Introduction, Paragraph 3. Obstacles in mobile communications are often modeled as knife-edges and must be considered when computing propagation information. Further multiple edges must be considered as per **Zhao2 in order to deal with terrain diffraction, see Zhao2, Introduction, first 2 sentences.**

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. All Claims are rejected.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

September 22, 2007

KAMINI SHAH
SUPERVISORY PATENT EXAMINER